**20CB/CS/DS/IT302**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **February, 2023** | **Common to CSE,CB, DS & IT Branches** | | |
| **Third Semester** | **Data Structures** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |
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| 1. | a) | | | Define ADT. | CO1 | L1 | 1M |
|  | b) | | | Write the node structure for representing Polynomial. | CO1 | L1 | 1M |
|  | c) | | | Difference between arrays and lists. | CO1 | L2 | 1M |
|  | d) | | | List any two applications of Linked lists. | CO2 | L2 | 1M |
|  | e) | | | What are the various Operations performed on the Stack? | CO2 | L1 | 1M |
|  | f) | | | How do you test for an empty Queue? | CO2 | L2 | 1M |
|  | g) | | | Differentiate internal and external sorting. | CO3 | L2 | 1M |
|  | h) | | | Define Height of a tree. | CO3 | L3 | 1M |
|  | i) | | | What are the applications of binary tree? | CO3 | L1 | 1M |
|  | j) | | | Define Complete binary tree. | CO3 | L2 | 1M |
|  | k) | | | What is meant by balancing factor of a node in AVL tree? | CO4 | L1 | 1M |
|  | l) | | | Define hash function. | CO4 | L2 | 1M |
|  | m) | | | List out the different applications of Priority Queue. | CO4 | L1 | 1M |
|  | n) | | | What is Probing? | CO4 | L1 | 1M |
|  | | **Unit – I** | | | | | |
| 2. | a) | | Discuss about asymptotic notations in detail. | | CO1 | L3 | 7M |
|  | b) | | Find the time and space complexity for finding factorial of a given number. | | CO1 | L2 | 7M |
|  | | (OR) | | | | | |
| 3. | a) | | Explain the following operations of a Single Linked list with an example:  i) insert\_at\_specific() ii)delete\_at\_begin() | | CO1 | L2 | 7M |
|  | b) | | Write a C-program to create a polynomial and display them. | | CO1 | L3 | 7M |
|  | | **Unit – II** | | | | | |
| 4. | a) | | Explain the evaluation of postfix expression. Evaluate the following postfix expression: 6 2 3 + - 3 8 2 / + \* 2 ^ 3 + | | CO2 | L3 | 7M |
|  | b) | | Sort the sequence 13,11, 74,37,85,39,22,56,25 using Insertion sort. | | CO2 | L3 | 7M |
|  | | **(OR)** | | | | | |
| 5. | a) | | Explain the enqueue and dequeue operations of linear queue with an example. | | CO2 | L3 | 7M |
|  | b) | | Write an algorithm for Radix sort technique. Illustrate with an example. | | CO2 | L2 | 7M |
|  | | **Unit - III** | | | | | |
| 6. | a) | | Illustrate functioning of various rotations in AVL tree with an example. | | CO3 | L2 | 7M |
|  | b) | | Create binary search tree for the following elements (23, 12, 45, 36, 5, 15, 39, 2, 19). Discuss about the height of the above binary search tree. | | CO3 | L3 | 7M |
|  | | **(OR)** | | | | | |
| 7. | a) | | Construct AVL Tree for the following elements:  18, 31, 13, 20, 39, 21,54. | | CO3 | L2 | 7M |
|  | b) | | Construct an expression tree for the expression a + (b \* c) + d \* (e + f), Give the outputs when you apply inorder and postorder traversals. | | CO3 | L3 | 7M |
|  | | **Unit - IV** | | | | | |
| 8. | a) | | Construct a Min heap tree for the following elements: 76, 69, 59, 47, 85, 99, 98 | | CO4 | L3 | 7M |
|  | b) | | Given the values {2341, 4234, 2839, 430, 22, 397, 3920} a hash table of size 7  and a hash function h(x) = x mod 7, show the resulting table after inserting the  values in the given order using separate chaining. | | CO4 | L4 | 7M |
|  | | **(OR)** | | | | | |
| 9. | a) | | What is Collision in hashing? Discuss any two collision resolution techniques with an example. | | CO4 | L2 | 7M |
|  | b) | | Sort the following elements using Heap Sort: 140, 80 , 30 , 20 ,10 ,40 ,30 ,60 ,100 ,70 ,160 ,50 , 130, 110, 120 | | CO4 | L3 | 7M |

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